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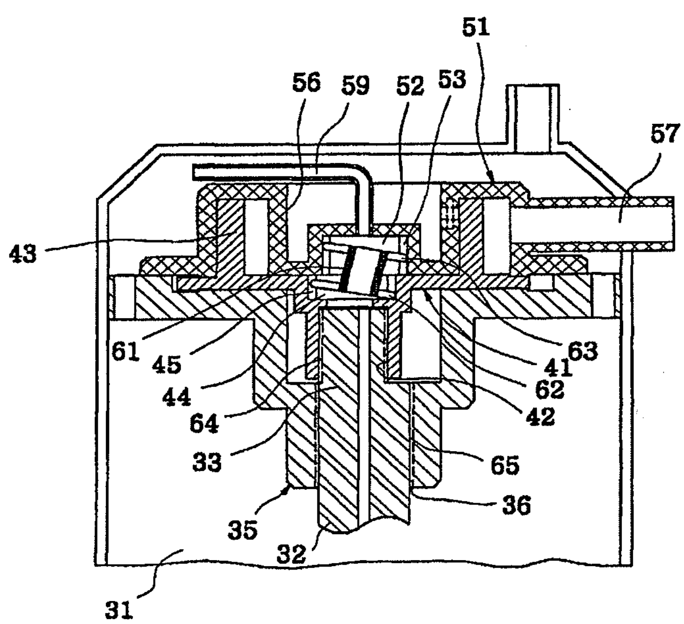
(54) Title: SMALL–SIZED COMPRESSOR

(57) Abstract

The present invention relates to a small–sized compressor. Air supplied from the outside via the air supplying hole (57) of a second housing (51) is allowed to enter the compression chamber (54) of the second housing (51). A circular space (44), into which a ring gear (45) is fitted, is formed at the center portion of one side of a rotator (41) that is rotated while the D–shaped portion (33) of a rotating shaft (32) is inserted into a D–shaped shaft hole (42). A circular space (52), into which a ring gear (53) is fitted, is formed at the center portion of the upper end of the second housing (51). The ring gears (45 and 53) are engaged with sun gears (62 and 63) formed in both sides of a rotation restrainer (61), and so a cam movement occurs as the rotating shaft (32) is rotated. Since the operation ring (43) of the rotator (41) is smaller than the compression chamber (54) and greater than the circular vane (56) communicated with the second housing (51) through a depression (55), air is allowed to be compressed by varying the closed volume by means of the cam movement. Air compressed in the compression chamber (54) is moved to the circular spaces (44 and 52) through a discharge hole (58) formed at the right side of the circular vane (56) of the second housing (51), and accumulated in a compression air tank (31) through a compressed air outlet (59). A rotator (41) is operated by a cam movement within first and second housings (35 and 51), thereby generating compressed air in a small space. In addition, the compressor can be allowed to be small–sized and light, so that it may be installed in an air conditioner.



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SMALL-SIZED COMPRESSOR

Technical Field

The present invention relates, in general, to a small-sized compressor and, more particularly, to a small-sized compressor, in which a circular space having a ring gear at its peripheral surface and a ring-shaped operating hole are integrally formed at one side of a rotating body that receives the rotating force of a rotating shaft fitted into a first housing, another circular space having another ring gear and a circular vane are integrally formed in the interior of a second housing that is engaged with the first housing, air supplied through the air supply hole of the second housing is compressed and is discharged through the discharge hole of the circular vane, thereby generating a large amount of highly compressed air in a relatively small space and being operated effectively.

Background Art

In general, a compressor is an apparatus in which one or more vanes elastically sustained by springs to be reciprocated are mounted to a rotor eccentrically and rotatably mounted in a cylinder, thereby compressing fluid, such as oil or air, and discharging the compressed fluid through an outlet while the vanes pushed to the outside are in contact with the inner surface of the cylinder as the rotor is rotated.

In the conventional small-sized compressor, the space between its cylinder and its rotor, which is rotated in the cylinder around an eccentric rotating shaft, is varied while the rotor gets near to and gets away from the cylinder. As the space is varied, its vanes become projected to the outside by the elastic force of a spring or become pushed to the inside by the inner wall of the cylinder. Accordingly, when the rotor is rotated fast, the vanes may be easily damaged in the process of being moved to the outside or inside. As a result, the conventional compressor is

problematic in that the rotor cannot be rotated fast and the material and size of the vanes are limited because the vanes are easily damaged.

In order to overcome the above defects of the conventional compressor, Koran Pat. No. 95-42007 is proposed.

In the vane pump of the patent, an inner rotor 3 having upper and lower radial air circulation holes 4 and 5 and air inlets 6 and 7 are integrally mounted around a shaft 1 having a spiral shaft hole 2 at its central portion and being rotated by a motor (not shown).

Air is supplied to the air circulation holes 4 and 5 through a large shaft hole 12 of an outer rotor 11 that is positioned eccentric to the shaft 1 while projected vanes are inserted into a circular operating hole.

An enclosed space defined by the outer surface of the inner rotor 3 and the inner surface of the outer rotor 11 is divided into a compression chamber and a supply chamber by the vane, and the air compressed in the compression chamber is discharged into the outside through the discharge hole of the outer rotor 11 by the variation of the volume of the compression chamber and the supply chamber.

In a housing 21 in which an enclosed type compressed air storage chamber is formed beside the outer rotor 11, air is supplied through air supply passages 22 and 23 connected to the outside to the large shaft hole 12 of the outer rotor 11 and, at the same time, the compressed air in the compressed air storage chamber is supplied to an outer compressed air tank.

An oil circulation groove 28 is formed in a portion that is in contact with the outer rotor 11 of the housing 21 at which oiling portions 26 and 27 are formed near oil supply holes 8 and 9, and an oil circulation hole 15 is formed within the large shaft hole 12 of the outer rotor 11 in contact with the shaft 1.

The oil circulation holes 28 and 15 are connected to the air circulation passage 16, thereby generating highly compressed air in an enclosed small space and being miniaturized to be mounted to an air conditioner.

However, in the conventional vane pump as described above, since compressed air is temporarily stored in the compressed air chamber beside the

housing 21 and is discharged to the outside while the shafts of the inner rotor 3 and the outer rotor 11 are different and the vane is inserted into the operating hole, the inner rotor 3, wherein the vane of the outer rotor 11 is inserted into the operation hole, comes into collision with the vane while being eccentrically rotated, and the vane comes into contact with both sides of the operation hole, thereby generating collision noise and abrasion during the compression of air.

Additionally, the leakage of compressed air occurs because the operating holes of the outer rotor 11 and the inner rotor 3 do not come into contact with each other, the construction for rotating the outer rotor 11 and the inner rotor 3 is complicated and the size of the compressor is large owing to the complication of the construction.

Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a small-sized compressor, in which a circular space having a ring gear at its peripheral surface and a ring-shaped operating hole are integrally formed at one side of a rotating body that receives the rotating force of a rotating shaft fitted into a first housing, another circular space having another ring gear and a circular vane are integrally formed in the interior of a second housing that is engaged with the first housing, air supplied through the air supply hole of the second housing is compressed and is discharged through the discharge hole of the circular vane, thereby generating a large amount of highly compressed air in a relatively small space and being operated effectively.

In order to accomplish the above object, the present invention provides a small-sized compressor, wherein:

oil moved through an oil supply hole formed in the central portion of a rotating shaft rotated in a compressed air tank by a motor is supplied to a circular space in which a rotating restrainer, lubricates a portion at which a rotating body

and a second housing are in contact with each other, and is moved through an oil circulation groove formed around the rotating shaft inserted into the D-shaped shaft hole of the rotating body, and lubricates the shaft hole of a first housing into which the rotating shaft is inserted, thereby allowing the rotating shaft to be smoothly rotated;

air supplied from the outside enters a compressing chamber within the second housing through an air supply hole formed at the left side of the circular vane of the second housing;

air supplied through an air supply hole of the second housing enters the compressing chamber of the second housing;

a space having a ring gear at its peripheral portion is formed on the lower center portion of the rotating body at which the D-shaped portion of the rotating shaft is inserted into the D-shaped shaft hole, a space having a ring gear at its peripheral portion is formed on the upper center portion of the second housing and the sun gears of a rotation restrainer are engaged with the ring gears, thereby allowing the rotating body to perform a stable cam movement;

air is rendered to be compressed by varying the enclosed size of the compressing chamber as the circular operating hole performs a cam movement because the circular operating hole is smaller than the compression chamber in the interior of the second housing and larger than the circular vane connected to the second housing through a concave portion; and

air compressed in the compressing chamber is moved to the circular space through a discharge hole formed at the right side of the circular vane of the second housing and, thereafter, is accumulated in the interior of the compressed air tank through a compressed air discharge hole, thereby allowing a rotating body to perform a stable cam movement, generating highly compressed air in a relatively small space, being miniaturized and, consequently, being mounted to an air conditioner.

Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a vertical sectional view showing the construction of a conventional vane pump;

Fig. 2 is a vertical sectional view showing a vane pump in accordance with a first embodiment of the present invention;

Figs. 3A to 3D are horizontal sectional views showing the operation of the vane pump in accordance with the first embodiment;

Fig. 4 is a vertical sectional view showing a vane pump in accordance with a second embodiment of the present invention;

Figs. 5A to 5D are horizontal sectional views showing the operation of the vane pump in accordance with the second embodiment;

Fig. 6 is a vertical sectional view showing a vane pump in accordance with a third embodiment of the present invention;

Figs. 7A to 7D are horizontal sectional views showing the operation of the vane pump in accordance with the third embodiment;

Fig. 8 is a vertical sectional view showing a vane pump in accordance with a fourth embodiment of the present invention;

Figs. 9A to 9D are horizontal sectional views showing the operation of the vane pump in accordance with the fourth embodiment;

Figs. 10A and 10B are horizontal sectional views showing the operation of a vane pump in accordance with a fifth embodiment;

Fig. 11 is a vertical sectional view showing a vane pump in accordance with a sixth embodiment of the present invention;

Fig. 12 is a horizontal sectional view showing the operation of the vane pump in accordance with the sixth embodiment; and

Fig. 13 is a vertical sectional view showing a vane pump in accordance

with a seventh embodiment of the present invention;

Best Mode for Carrying Out the Invention

A preferred embodiment of the present invention is described with reference to the accompanying drawings, hereinafter.

Figs. 2 and 3A to 3D are views showing a compressor in accordance with a first embodiment of the present invention.

A rotating shaft 32 rotated in a compressed air tank 31 by a motor (not shown) is fitted into the shaft bore 36 of a first housing 35 to be stably rotated.

A rotating body 41 has at its lower portion a D-shaped shaft groove 42 into which the D-shaped upper portion 33 of the rotating shaft 32 is fitted to transmit the rotating force of the rotating shaft 32 to the rotating body 41, at its upper outer portion a ring-shaped operating hole 43, and at its upper central portion a circular space 44 at the peripheral surface of which a ring gear 45 is formed.

A second housing 51 engaged with the first housing 35 has a circular space 52, which is eccentrically connected with the circular space 44 of the rotating body 41 and has a ring gear 53 at its peripheral surface.

A rotation restrainer 61 is mounted in the circular spaces 44 and 52 with its sun gears 45 and 53 of the rotation restrainer 61 engaged with the ring gears 45 and 53 of the circular spaces 44 and 52, so that as the rotating shaft 32 is rotated, the rotating body 41 stably performs a cam movement while being retained by the center portion of the second housing 51.

A circular vane 56 fitted into the operating hole 43 is integrally connected at the circular compression chamber 54 of the second housing 51 with the second housing 51 through the concave portion 55 of the second housing 51, so that air supplied through an air supply hole 57 formed at the left side of the concave portion 55 of the second housing 51 is compressed and is discharged through an outlet 58 formed at the right side of the concave portion 55 of the second housing

51.

A discharge conduit 59 is connected to the circular space 52, so that air discharged into the circular spaces 44 and 52 through the outlet 58 is accumulated in the compressed air tank 31.

A shaft central hole 34 is formed in the central portion of the rotating shaft 32, so that oil is moved upward through the shaft central hole 34 into the circular spaces 44 and 52 in which the rotation restrainer 61 is mounted and lubricates the portions at which the rotating body 41 and the second housing 51 are in contact with each other.

An oil circulation groove 64 is formed around the D-shaped upper portion 33 of the rotating shaft 32 fitted into the D-shaped shaft hole 42 of the rotating body 41 and an oil circulation groove 65 is formed around the rotating shaft 32 fitted into the shaft bore 36 of the first housing 35, so that the oil is circulated through the oil circulation grooves 64 and 65 to allow the rotating shaft 32 to be smoothly rotated in the first housing 36 together with the rotating body 41.

The small-sized compressor constructed as described above generates compressed air and supplies the compressed air to an outside air conditioner while its rotating shaft 102 is rotated in the compressed air tank 31 by the motor.

Oil that is moved upward through the shaft central hole 34 formed in the central portion of the rotating shaft 32 is supplied to the circular spaces 44 and 52 to which the rotation restrainer 61 is mounted and lubricates the portions at which the rotating body 41 and the second housing 51 are in contact with each other.

While the oil is circulated through the oil circulation groove 64, which is formed around the D-shaped upper portion 33 of the rotating shaft 32 fitted into the D-shaped shaft hole 42 and the oil circulation groove 65, which is formed around the rotating shaft 32 fitted into the shaft bore 36 of the first housing 35, the oil allows the rotating shaft 32 to be smoothly rotated together with the rotating body 41 while being fitted into the first housing 36.

The rotating shaft 32, which is rotated in the compressed air tank 31 by the motor while being fitted into the shaft bore 36 of the first housing 35, is rotated

together with the rotating body 41 that is fitted around the D-shaped upper portion 33 of the rotating shaft 32 at its D-shaped shaft groove 42.

The rotating body 41 performs a cam movement in such a way that the operating hole 43 of the rotating body 41 is not only disposed between the circular compression chamber 54 and the circular vane 56, but also the sun gears 62 and 63 of the rotation restrainer 61 are engaged with the ring gears 45 and 53 of the circular spaces 44 and 52.

As illustrated in Fig. 3A, in a state where air has entered the non-compressed space "a" of the compression chamber 54, as the rotating shaft 32 is rotated, the rotating body 41 performs a clockwise cam movement by means of the rotation restrainer 61 retained by the second housing 51.

As illustrated in Fig. 3B, when the rotating body 41 performs a cam movement of 90° with the aid of the rotating shaft while the circular vane 56 of the second housing 51 is fitted into the operating hole 43 of the rotating body 41, the non-compressed space "a" is defined by the operating hole 43 of the rotating body 41 and the circular vane 56 of the second housing 51.

As illustrated in Fig. 3C, when the rotating body 41 performs a cam movement of 180°, the compression chamber 54 is divided into the non-compressed space "a", the compressed space "b" and the completely compressed space "c", and the compressed space "b" of the compression chamber 54 is compressed more.

As illustrated in Fig. 3D, when the rotating body 41 performs a cam movement of 270°, compressed air in the completely compressed space "c" is discharged into the circular spaces 44 and 52 through the discharge hole 58 and is accumulated in the compressed air tank 31 through the discharge passage 59.

Although there is described a case where the ring gears 45 and 53 formed on the peripheral portions of the circular spaces 44 and 52 are engaged with the sun gears 62 and 63 of the rotation restrainer 61 as in the above embodiment, another case where linear grooves formed on the peripheries of the circular spaces are engaged with linear projections formed on the rotation restrainer or cross-

shaped grooves formed on the peripheries of the circular spaces are engaged with cross-shaped grooves formed on the rotation restrainer, so as to allow the rotating body 41 to perform a cam movement without being rotated.

Fig. 4 and Figs. 5A to 5D are views showing a small-sized compressor in accordance with a second embodiment of the present invention.

A rotating shaft 102 rotated in a casing 101 by a motor (not shown) and rotated stably by means of the centrifugal force generated by a weight 103 is fitted into the shaft bore 106 of a first housing 105 to be stably rotated.

A wobble body 111 has at its lower central portion a D-shaped shaft groove 112 into which the D-shaped upper portion 104 of the rotating shaft 102 is fitted to transmit the rotating force of the rotating shaft 102 to the wobble body 111, at its lower outer portion and upper outer portion operating holes 113 and 113a, and at its upper central portion a circular space 114 at the peripheral surface of which a ring gear 115 is formed.

A second housing 121 engaged with the first housing 105 has a circular space 122, which is eccentrically connected with the circular space 114 of the wobble body 111 and has a ring gear 123 at its peripheral surface.

A rotation restrainer 131 is mounted in the circular spaces 114 and 122 with its sun gears 132 and 133 of the rotation restrainer 131 engaged with the ring gears 115 and 123 of the circular spaces 114 and 122, so that as the rotating shaft 102 is rotated, the wobble body 111 stably performs a cam movement while being retained by the center portion of the second housing 121.

A circular vane 126 fitted into the operating holes 113 and 113a is integrally connected at the circular compression chamber 124 of the second housing 121 with the second housing 121 through a concave portion 125 of the second housing 121, so that air supplied through an air supply hole 127 and 127a formed at the outside of the concave portion 125 of the second housing 121 is compressed, is moved through a moving hole 116 and is discharged through an outlet 128 formed at the right side of the concave portion 125 of the circular vane 128 and backward-flowing-prevented by a valve 128a.

A storage chamber 129 is connected to the outlet 128 and a discharge hole 130 is connected to the storage chamber 129, so that air moved into the storage chamber 129 through the outlet 128 is accumulated in the casing 101.

Contact projections 118 and 119 are formed at the ends of the operating holes 113 and 113a respectively having through holes 117, and scratching preventing concave portions 134 and 135 are formed at the outer surface of the circular vane 126, so that airtightness is maintained while the wobble body 111 performs a stable cam movement in the first and second housings 105 and 121, thereby generating highly compressed air in a relatively small space.

The small-sized compressor in accordance with the second embodiment compresses air and is supplied to an outside air conditioner while the rotating shaft 102 is rotated in the casing 101 by the motor.

The compressed air is generated in such a way that the rotating shaft 103, which is rotated within the casing 101 by the motor, is rotated together with the wobble body 111 that is fitted around the D-shaped upper portion 104 of the rotating shaft 102 at the D-shaped shaft hole 112.

The wobble body 111 performs a cam movement in such a way that its operating holes 113 and 113a are not only disposed between the circular compression chamber 124 of the second housing 121 and the circular vane 126, but also the sun gears 132 and 133 of the rotation restrainer 131 are engaged with the ring gears 115 and 123 of the circular spaces 114 and 122.

As illustrated in Fig. 5A, in a state where the air has entered the non-compressed space "a" of the circular compression chamber 124 through the air inlet 127 of the second housing 121, as the rotating shaft 102 is rotated, the wobble body 111 performs a clockwise cam movement by means of the rotation restrainer 131 retained by the second housing 121.

As illustrated in Fig. 5B, when the wobble body 111 performs a cam movement of 90° with the aid of the rotating shaft 102 while the circular vane 126 is fitted into the operating hole 113 of the wobble body 111, the non-compressed space "a" is defined by the operating hole 113 of the wobble body 111 and the

outer surface of the circular vane 126.

As illustrated in Fig. 5C, when the wobble body 111 performs a cam movement of 180°, the circular compression chamber 124 is divided into the non-compressed space “a”, the compressed space “b” and the completely compressed space “c”, and the compressed space “b” of the circular compression chamber 124 is compressed more.

As illustrated in Fig. 5D, when the wobble body 111 performs a cam movement of 270°, the compressed air in the completely compressed space “c” is discharged into the storage chamber 129 and is accumulated in the casing 101 through the compressed air discharge passage 130.

In such a case, owing to the through hole 117 of the ring-shaped operating hole 113, a drawing force generated while compressed air is discharged through the discharge hole 128 and a vacuum state is generated is prevented and, consequently, air can flow into the ring-shaped operating hole 113 stably in the next cycle.

Fig. 6 and Figs. 7A to 7D are views showing a small-sized compressor in accordance with a third embodiment of the present invention.

A shaft central hole 203 is formed in the central portion of the rotating shaft 202 that is rotated in a compressed air tank 201 by a motor (not shown), so that oil is moved upward through the shaft central hole 203 to a portion in which a uniform velocity coupling 204 is mounted.

An oil supply hole 208 is formed between the bearing 206 of an upper housing 205 and a roller 207, so that oil is moved upward through the oil supply hole 208 to allow the roller 207 to be rotated smoothly.

An oil circulation passage 209 is formed in the upper housing 205 and an oil passage 211 is formed in a rotor 210 and an oil collecting hole 212 is formed in the upper housing 205, so that oil lubricates the upper end of the rotor 210 in contact with the upper housing 205 while being moved from the oil supply hole 208 to the oil circulation passage 211, is moved downward through the oil hole 211 of the rotor 210, is supplied to the portion at which the rotor 210 and the roller

207 are in contact with each other to allow their smooth rotation, and is discharged through the oil collecting hole 212 into an compressed air tank 201.

An oil hole 213 is formed in the roller 207, so that oil supplied between the roller 207 and the rotor 210 at the portion at which the uniform velocity coupling 204 is mounted passes through the oil hole 213 and is supplied to the portion that is in contact with the rotor 210 to allow the smooth rotation of the roller 210.

An oil circulation passage 215 is formed between the shaft 202 integrated with the rotor 210 and the lower housing 214, an oil circulation groove 216 is formed in the lower housing 214 and an oil collecting hole 217 is formed in the lower housing 214, so that a portion of oil supplied between the roller 207 and the rotor 210 flows through the oil circulation groove 216, is accumulated in the oil circulation groove 216 and is discharged through the oil collecting hole 217 to the lower end of the compressed air tank 201.

An air inlet 219 is formed through a side housing 218 and an air supply space 220 is formed between the side housing 218 and the rotor 210, so that air supplied from the outside through the air inlet 219 is temporarily stored in the air supply space 220.

An air supply hole 222 is formed at the left side of a circular vane 221 of the rotor 210, so that the air in the air supply space 220 is supplied to a compression chamber between the rotor 210 and the circular vane 221, which are integrated into a single body through a concave portion 223, through the air supply hole 222.

The circular vane 221 of the rotor 210 is inserted to the operating hole 224 of the roller 207 situated in the compression chamber between the rotor 210 and the circular vane 221 and the roller 207 is eccentric to the rotor 210, so that air supplied through the air supply hole 222 is compressed by the variation of the volume of the compression chamber.

A space 225 having a ring gear 226 at its peripheral surface is formed on the lower center portion of the roller 207, a space 227 having a ring gear 228 at its

peripheral surface is formed on the upper center portion of the rotating shaft 202 and the sun gears 229 and 230 of the uniform velocity coupling 204 are engaged with the ring gears 226 and 228, so that the roller 207 eccentric to the rotating shaft 202 is rotated at a uniform velocity.

A reed valve 232 is formed in the rotor 210, a discharge hole 231 is formed at the right side of the circular vane and a compressed air discharge hole 234 is formed in the upper housing 205, so that air compressed in the compressed chamber is supplied to the compressed air chamber 233 through the discharge hole 231 while being prevented from flowing backward by the reed valve 232 and is accumulated in the compressed air tank 201 through the compressed air discharge hole 234.

Since the circular vane 221 is integrally connected to the rotor 210 through the concave portion 223, the circular vane 221 is secured by means of a bolt at the upper portion of the rotor 210 so as to prevent damage by compression force.

In the small-sized compressor in accordance with the third embodiment, while the rotating shaft 202 is rotated within the compressed air tank 201 by the motor, compressed air is generated and utilized in an outside air conditioner.

Air supplied through the air inlet 219 of the side housing 218 from the outside is temporarily stored in the air supply space 220 between the side housing 218 and the rotor 210.

The air in the air supply space 220 is supplied to the compression chamber between the circular vane 221 and the rotor 210 through the air supply inlet 222 formed the right side of the circular vane 221 of the rotor 210.

As illustrated in Fig. 7A, in a state where the air has entered the non-compressed space "a" of the compression chamber, as the rotating shaft 202 is rotated, the rotor 210 that directly receives a rotating force from the rotating shaft 202 and the roller 206 that receives a rotating force through the uniform velocity coupling 204 performs a counterclockwise cam movement while the circular vane 221 is fitted into the circular operating hole 224 of the roller 207.

As illustrated in Fig. 7B, when the rotor 210 is rotated counterclockwise by 90° with the aid of the rotating shaft 202 while the circular vane 221 is fitted into the circular operating hole 224 of the roller 207, the non-compressed space "a" is defined by the rotor 210 and the outer surface of the roller 207, and air is continuously supplied through the air supply hole 222.

As illustrated in Fig. 7C, when the rotor 210 and the roller 207 are rotated by 180°, the compression chamber is divided into the non-compressed space "a", the compressed space "b" and the completely compressed space "c", and the compressed space "b" of the circular compression chamber 124 is compressed more.

As illustrated in Fig. 7D, when the roller 210 and the rotor 210 are rotated by 270°, the compressed air in the completely compressed space "c" pushes the backward-flowing-preventing reed valve 232 and is temporarily stored in the compressed air storage chamber 233 through the compressed air discharge hole 231. Thereafter, the compressed air is accumulated in the compressed air tank 201 through the compressed air discharge hole 234 and the compressed air in the compressed space "b" is generated near the compressed air discharge hole 231, thereby generating new non-compressed space "a" to be generated, allowing new air to be supplied and, consequently, allowing compressed air to be generated continuously.

In such a case, the rotor 210 is integrated with the rotating shaft 202 and rotated together with the rotating shaft 202. The roller 207, which is eccentric to the rotating shaft 202, is rotated at a uniform velocity in such a way that a space having a ring gear 226 at its periphery is formed on the center portion of the roller 207, a space 227 having a ring gear 228 at its periphery is formed on the upper center portion of the rotating shaft 202 and the sun gears 229 and 230 of the uniform velocity coupling 204 are engaged with the ring gears 226 and 228.

Although the rotating shaft 202 is rotated counterclockwise by forming the air supply hole 222 at the left side of the circular vane 221 of the rotor 210 and forming the discharge hole 231 having the reed valve 232 at the right side of the

circular vane 221, there is no difference in compressing air if the rotating shaft 202 is rotated clockwise by forming the air supply hole 222 at the right side of the circular vane 221 of the rotor 210 and forming the discharge hole 231 having the reed valve 232 at the left side of the circular vane 221.

Fig. 8 and Figs. 9A to 9D are views showing a small-sized compressor in accordance with a fourth embodiment.

A spiral central hole 304 is formed in the central portion of the rotating shaft 303 that is rotated in a compressed air tank 301 by a motor 302, so that oil is moved upward through the spiral central hole 304 to a portion in which a uniform velocity coupling 305 is mounted.

An oil supply hole 308 is formed through the bearing 307 of the upper housing 306, so that oil is moved upward through the oil supply hole 308 and is supplied to the rotor 309 to allow the rotor 309 to be rotated smoothly.

An oil circulation passage 310 is formed through the rotor 309 and an oil passage 311 is formed in the rotor 309, so that oil lubricates the upper end of the rotor 210 while being moved through the oil circulation passage 310 of the rotor 309 and is moved downward through the oil passage 311 of the rotor 309 and is supplied between the rotor 309 and the roller 312.

Two oil circulation passages 313 are formed beside the bearing 307 and an oiling space 314 is formed around the roller 312, so that oil supplied to the roller 312 enters the oiling space 314 through the oil circulation passages 313.

An oil collecting hole 315 is formed in the rotor 309, an oil circulation hole 317 is formed in the lower housing 316 and an oil collecting conduit 318 is connected to the oil circulation hole 317, so that oil passing through the roller 312 and the bearing 307, and the roller 312 and the rotor 309 passes through the oil collecting hole 315, is collected in the oil circulation hole 317 and is discharged through the oil collecting conduit 318 to the compressed air tank 301.

An air inlet 319 is formed through the upper housing 306 and an air supply hole 320 is formed in the center portion of the bearing 307, so that air is supplied from the outside through the air inlet 319 and is temporarily stored in the

air supply hole 320.

An air supply hole 322 is formed at the right side of the operating hole 321 of the roller 312 and a compression chamber 323 is formed within the rotor 309, so that air in the air supply hole 320 is supplied to the compression chamber 323 through the air supply hole 322.

Projections 325a and 325b are formed at the entrance of the circular operating hole 321 of the roller 312 and concave connecting portions 326a and 326b are formed at the circular vane 324, so that air is compressed by the variation of the volume of the circular operating hole 321 and the compression chamber 323 while airtightness is maintained in such a way that the projections 325a and 325b are in contact with the concave connecting portions 326a and 326b because the circular operating hole 321 into which the circular vane 324 of the rotor 309 is inserted has a relatively large volume.

A space 327 having a ring gear 328 at its peripheral portion is formed on the lower center portion of the roller 312, a space 329 having a ring gear 330 at its peripheral portion is formed on the upper center portion of the rotating shaft 303 and the sun gears 332 and 333 of the uniform velocity coupling 331 are engaged with the ring gears 328 and 330, so that the roller 312 eccentric to the rotating shaft 303 is rotated at a uniform velocity.

A reed valve 334 is formed on the peripheral surface of the rotor 210, a discharge hole 231 is formed at the right side of the circular vane and a compressed air discharge conduit 336 is formed in the lower end of the upper housing 316, so that air compressed in the compressed chamber is supplied to the outside compressed air storage chamber 335 while being prevented from flowing backward by the reed valve 334 and is accumulated in the compressed air tank 301 through the compressed air discharge conduit 336.

Air compressed in the circular operating hole 321 is accumulated in the compressed air tank 301 together with oil that is circulated through the compressed air discharge hole 337 having a backward-flowing-preventing reed valve 338.

In the small-sized compressor in accordance with the fourth embodiment,

air supplied from the outside through the air inlet 319 of the upper housing 306 is temporarily stored in the air supply hole 320 formed at the center portion of the bearing 307.

The air in the air supply hole 320 is supplied to the compression chamber 323 through the air supply hole 322 formed at the right side of circular operating hole 321 of the roller 313.

As illustrated in Fig. 9A, in a state where air has entered the non-compressed space "a" of the compression chamber, as the rotating shaft 301 is rotated, the rotor 309 that directly receives a rotating force from the rotating shaft 202 and the roller 312 that receives a rotating force through the uniform velocity coupling 305 performs a clockwise cam movement while the circular vane 309 is fitted into the circular operating hole 321 of the roller 312.

As illustrated in Fig. 9B, when the rotor 309 is rotated clockwise by 90° with the aid of the rotating shaft 301 while the circular vane 324 is fitted into the circular operating hole 321 of the roller 207, the volume of the compressed space "b" is reduced by the rotor 309, the circular vane 324 and the roller 312 and the non-compressed space "a" is newly generated, thereby allowing air to be supplied from the outside.

In this case, the rotor 309 is rotated somewhat more than the roller 312 because the roller 312 is eccentric to the rotating shaft 312, the projections 325a formed at the entrance of the circular operating hole 321 come into contact with the concave connecting portion 326a of the circular vane 324 because the circular operating hole 321 of roller 312 is larger than the circular vane 324 of the rotor 309 and, consequently, the compressed space "b" is kept air-tight.

As illustrated in Fig. 9C, when the rotor 309 and the roller 312 are rotated by 180°, the volume of the compressed space "b" becomes similar to the volume of the non-compressed space "a" and the air in the compressed space "b" of the compression chamber 323 is compressed more.

At this time, the circular vane 324 of the rotor 309 that is fitted into the circular operating hole 321 of the roller 312 comes into contact with the entrance

of the circular operating hole 321 and, therefore, airtightness can be maintained.

As illustrated in Fig. 9D, when the roller 312 and the rotor 309 are rotated by 270°, a portion of the air compressed in the compressed space "b" pushes the backward-flowing-preventing reed valve 334, is temporarily stored in the compressed air storage chamber 235 through the compressed air discharge hole 334a and, thereafter, is accumulated in the compressed air tank 301 through the compressed air discharge conduit 336.

In this case, the rotor 309 is rotated somewhat less than the roller 312 because the roller 312 is eccentric to the rotating shaft 312, the projections 325a formed at the entrance of the circular operating hole 321 come into contact with the concave connecting portion 326a of the circular vane 324 because of the circular operating hole 321 of the roller 312 being larger than the circular vane 324 of the rotor 309 and, consequently, the compressed space "b" is kept air-tight.

As illustrated in Fig. 9A, when the roller 312 and the rotor 309 are rotated by 360°, the compressed air is almost discharged, but the compressed air remains in a second compressing space, or the space 321a of the circular operating space 321 and has entered the non-compressed space "a".

The compressed air remaining in the circular operating hole 321a of the roller 312 is discharged through the compressed air discharge hole 337 having a backward-flowing-preventing reed valve 338 and is accumulated 301 together with the circulated oil in the compressed air tank because the interior of the circular operating hole 321 is completely eliminated while the rotors 309 and 312 are rotated by 90°.

In such a case, the rotor 309 is integrated with the rotating shaft 303 and rotated together with the rotating shaft 303. The roller 312, which is eccentric to the rotating shaft 303, is rotated at a uniform velocity in such a way that a space 327 having a ring gear 328 at its periphery is formed on the center portion of the roller 312, a space 329 having a ring gear 330 at its periphery is formed on the upper center portion of the rotating shaft 303 and the sun gears 332 and 333 of the uniform velocity coupling 331 are engaged with the ring gears 328 and 330.

Figs. 10A and 10B are horizontal sectional views showing a small-sized compressor in accordance with a fifth embodiment of the present invention.

An air supply hole 362 is formed in the center portion of a bearing and backward-flowing-preventing reed valves 366a and 367a are mounted to air supply holes 366 and 367, so that air supplied from the outside through the air inlet of the upper housing and temporarily stored in the air supply hole 362 is supplied to a compression chamber 368 formed between a roller 363 and a rotor 369 through the air supply holes 366 and 367.

The projections are formed at the entrances of two circular operating holes 363 and 365 to which two circular vanes 370 and 371 formed on the opposite sides of the rotor 369 are inserted and the concave connecting portions are formed on the two circular vanes 370 and 371, so that air is compressed by the variation of the volume of the circular operating holes 364 and 365 and the compression chamber 368 while airtightness is maintained in such a way that the projections 364 and 365 are in contact with the concave connecting portions of the circular vanes 370 and 371.

Reed valves 372 and 373 are formed on the peripheral surface of the rotor 369, so that air compressed in the compression chamber 368 is supplied to the compressed air storage chamber 375 while being prevented from flowing backward and is accumulated in the compressed air tank.

Compressed air discharge holes 376 and 378 respectively have backward-flowing-preventing reed valves 377 and 379, so that air compressed in the two circular operating holes 364 and 365 of the roller 363 is discharged through the compressed air discharge holes 376 and 378 and is accumulated in the compressed air tank together with circulated oil.

Figs. 11 and 12 are views showing a small-sized compressor in accordance with a sixth embodiment of the present invention.

A spiral central hole 404 is formed in the central portion of the shaft 403 rotated in a motor case 401 by a motor 402, so that oil is moved upward through the spiral central hole 404 to a portion in which a uniform velocity coupling 405 is

mounted.

An oil supply hole 406 and a balance type seal 400, wherein a seal ring 407 is elastically pushed by a washer spring 408, a backup ring 409 and an O-ring 410, are formed, so that a portion of the oil passes through the bearing oil supply hole 406 and allows the shaft 403 to be rotated smoothly while not being mixed with air by means of the balance type seal 400.

An oil circulation hole 412 and an oiling space 413 are formed in a rotor 411, so that a portion of the oil enters the oiling space 413 through the oil circulation hole 412 and allows an inner rotor 411 and an outer rotor 414 to be smoothly rotated.

While the remaining oil is moved upward through the oil supply hole 415 of an upper housing 420, the remaining oil is supplied to a portion in contact with an inner rotor 411 through an oil inlet 416 to allow the inner rotor 411 to be rotated smoothly and, at the same time, is supplied to an oil circulation hole 418 beside an outer rotor 414 through an oil discharge hole 417 to allow the outer rotor 414 to be rotated smoothly. Thereafter, the oil is discharged through a discharge hole 419 to the outside of an upper housing 420 on which cells 421 are formed.

Air supplied through an air inlet 423 from the outside is temporarily stored in an air circulation hole 424 formed beside the outer rotor 414.

The air in the air circulation hole 424 is supplied through an air inlet 426 formed at the right side of the vane 425 of the outer rotor 414 to a compression chamber 427 formed beside the inner rotor 411.

The air is compressed by the variation of the volume of a compression chamber 427 while airtightness is maintained by a multiple clamper consisting of overlapped thin ring-shaped clampers that is positioned in the circular hole 428 of the inner rotor 411 to which the vane 425 of the outer rotor 414 is inserted.

A space 431 having a ring gear 432 at its peripheral surface is formed at the center of the lower end of the inner rotor 411 that is inserted into the circular hole 428 so that the multiple clamper 429 is made airtight by an apex seal 430, a space 433 having a ring gear 434 at its peripheral surface is formed at the center of

the upper end of the shaft 403, and sun gears 436 and 437 formed at both sides of a uniform velocity coupling 435 are engaged with the ring gears 432 and 434, thereby allowing the inner rotor 411 eccentric to the shaft 403 to be rotated at a uniform velocity.

The air compressed in the compression chamber 427 is supplied to the central space 440 of the upper housing 420 through the supply hole 439a of the inner rotor 411 and the circular space 439 while being prevented from flowing backward by a reed valve 438 formed at the peripheral surface of the inner rotor 411. Thereafter, the air is accumulated in an outside air tank (not shown) through an air discharge conduit 441 formed at the upper end of a motor case 401.

Fig. 13 is a view showing a small-sized compressor in accordance with a seventh embodiment of the present invention.

The rotating shaft 512 of a first rotating body 511 rotated in a compressed air tank 501 by a motor (not shown) is fitted into the shaft bore 503 of a lower housing 502 to be stably rotated.

A cover 513 is formed at the outside of the spiral vane (not shown) of the first rotating body 511, and a circular projecting 514 integrated with a ring gear 515 at its inner surface is connected to the end of the cover 513.

A shaft bore 522 integrated with sun gears 523 at its outer surface is formed at one side of a second rotating body 521 on the other side of which a spiral vane (not shown) is in contact with the spiral vane of the first rotating body 511.

A uniform velocity coupling 531 is mounted with the ring gear 515 of the circular projection 514 and the sun gear 523 of the shaft bore 522 respectively engaged with the sun gear 532 of its outer surface and the ring gear 533 of its inner surface, so that the rotating force of the first rotating body 511 is transmitted to the second rotating body 521 and allows the second rotating body 521 to be rotated at a uniform velocity.

A compressed air discharge hole 506 at the central portion of the bearing 505 of the upper housing 504 allows air compressed by the spiral vanes of the first

and second rotating bodies 511 and 521 to be discharged into a compressed air tank 501 while the shaft bore 522 of the second rotating body 521 is fitted around the bearing 505 and is rotated.

An air storage chamber 516 defined by a side housing 507, which is disposed between the upper housing 504 and the lower housing 502 by bolts (not shown), and the cover 513 of the first rotating body 511 temporarily stores air that flows from the outside through the air inlet 508 of the side housing 507, passes through the air inlet 517 of the first rotating body 511 and is compressed in a compression chamber 518 in which the spiral vanes of the first and second rotating bodies 511 and 521 are situated.

An oil supply hole 519 is formed in the central portion of the rotating shaft 512 so that oil is moved upward through the oil supply hole 519 and is supplied to the shaft bore 503 of the lower housing 502 to allow the rotating shaft 512 to be rotated without hindrance.

An oil supply passage 520 is formed in the interior of the first rotating body 511, so that oil supplied to the end of the oil supply hole 519 moves through the oil supply passage 520, passes through the portions at which the first rotating body 511 and the upper housing 504 are in contact with each other and is supplied to the portion in which the uniform velocity coupling 531 is mounted.

A lower oil hole 524 is formed in the second rotating body 521, an oil circulation groove 509 and an upper oil hole 525 are formed to be in contact with the bearing 505 of the upper housing 504 and an oil discharge hole 510 is formed in the upper housing 510, so that a portion of oil, which allowed the uniform velocity coupling 531 to transmit power without hindrance in the portion in which the uniform velocity coupling 531 is mounted, passes through the lower oil hole 524, the oil circulation groove 509 and the upper oil hole 525 and is discharged into a compressed air tank 501 through the oil discharge hole 510.

Industrial Applicability

As described above, the present invention provides a small-sized compressor, wherein air supplied from the outside through the air inlet of a second housing enters the compression chamber of the second housing, a rotating body performs a stable cam movement in such a way that a space having a ring gear at its peripheral portion is formed on the lower center portion of the rotating body, a space having a ring gear at its peripheral portion is formed on the upper center portion of the rotating body and the sun gears of a rotation restrainer are engaged with the ring gears, air is compressed by the variation of the enclosed volume of a compression chamber because the circular operating hole is smaller than the compression chamber in the interior of the second housing and larger than the circular vane connected to the second housing through a concave portion, air compressed in the compression chamber is moved to a circular space through a discharge hole formed on the right side of a circular vane of the second housing and is accumulated in a compressed air tank through a compressed air discharge hole, thereby allowing a rotating body to perform a stable cam movement, generating highly compressed air in a relatively small space, being miniaturized and, consequently, being mounted to an air conditioner.

Claims

1. A small-sized compressor, wherein:

a rotating shaft 32 rotated in a compressed air tank 31 by a motor is fitted into the shaft bore 36 of a first housing 35 to be rotated stably;

a rotating body 41 has at its lower portion a D-shaped shaft groove 42 into which the D-shaped upper portion 33 of the rotating shaft 32 is fitted to be rotated together with the rotating shaft 32, at its upper outer portion an operating hole 42, and at its upper central portion a circular space 44 at the peripheral surface of which a ring gear are formed;

a second housing 51 engaged with the first housing 35 has a circular space 52 that is eccentrically connected to the circular space 44 of the rotating body 41 and has a ring gear 53 at its peripheral surface;

a rotation restrainer 61 is mounted in the circular spaces 44 and 52 with its sun gears 45 and 53 of the rotation restrainer 61 engaged with the ring gears 45 and 53 of the circular spaces 44 and 52 so that as the rotating shaft 32 is rotated, the rotating body 41 stably performs a cam movement while being retained by the second housing 51;

a circular vane 56 fitted into the operating hole 43 is integrally connected at the circular compression chamber 54 of the second housing 51 with the second housing 51 through a concave portion 55 of the second housing 51 so that air supplied through an air supply hole 57 formed at the left side of the concave portion 55 of the second housing 51 is compressed and is discharged through an outlet 58 formed at the right side of the concave portion 55 of the second housing 51; and

a discharge conduit 59 is connected to the circular space 52 so that air discharged into the circular spaces 44 and 52 through the outlet 58 is accumulated in the compressed air tank 31.

2. The compressor according to claim 1, wherein linear grooves formed

on the peripheries of the circular spaces are engaged with linear projections formed on the rotation restrainer or cross-shaped grooves formed on the peripheries of the circular spaces are engaged with cross-shaped grooves formed on the rotation restrainer, so as to allow the rotating body 41 to perform a cam movement as the rotating shaft is rotated.

3. A small-sized compressor, wherein

a rotating shaft 102 rotated in a casing 101 by a motor is fitted into the shaft bore 106 of a first housing 105,

a wobble body 111 is provided with at its upper central portion a circular space 114 having a ring gear 115 at its peripheral surface,

a second housing 121 engaged with the first housing 105 is provided with a circular space 122 having a ring gear 123 at its peripheral surface,

a rotation restrainer 131 is mounted in the circular spaces 114 and 122 with its sun gears 132 and 133 of the rotation restrainer 131 engaged with the ring gears 115 and 123 of the circular spaces 114 and 122, so that the wobble body 111 stably performs a cam movement, and

a circular vane 126 fitted into the operating holes 113 and 113a is integrally connected at the circular compression chamber 124 of the second housing 121 with the second housing 121 through a concave portion 125 of the second housing 121, so that air is received through an air supply hole 127 and 127a, characterized in that:

the rotating shaft 102 is rotated stably while receiving a centrifugal force from a weight 103 mounted on one side of the rotating shaft 102;

air compressed in the ring-shaped operating space 113 is moved through the moving hole 116 of the wobble body 111 to a ring-shaped operating space 113a and is discharged through a discharge hole 128 formed on the right side of the concave portion 125 of the circular vane 126; and

air is moved to an air storage chamber 129 through the compressed air discharge hole 130 and is accumulated in the casing 101.

4. The compressor according to claim 3, wherein through holes 117 are formed on one side ends of the ring-shaped operating holes 113 and 113a, and contact projections 118 and 119 are formed at the ends of the operating holes 113 and 113a, so that airtightness is maintained while the wobble body 111 performs a stable cam movement in the first and second housings 105 and 121, thereby generating highly compressed air in a relatively small space.

5. A small-sized compressor, oil being moved upward through the shaft central hole 203 that is formed in the central portion of the rotating shaft 202 rotated in a compressed air tank 201 by a motor is supplied to a portion in which a uniform velocity coupling 204 is mounted, wherein:

an oil circulation passage 209 is formed in the upper housing 205 and an oil passage 211 is formed in a rotor 210 and an oil collecting hole 212 is formed in the upper housing 205, so that oil lubricates the upper end of the rotor 210 in contact with the upper housing 205 while being moved from the oil supply hole 208 to the oil circulation passage 211, is moved downward through the oil hole 211 of the rotor 210, is supplied to the portion at which the rotor 210 and the roller 207 are in contact with each other to allow their smooth rotation and is discharged through the oil collecting hole 212 into a compressed air tank 201;

an oil hole 213 is formed in the roller 207, so that oil supplied between the roller 207 and the rotor 210 at the portion at which the uniform velocity coupling 204 is mounted passes through the oil hole 213 and is supplied to the portion that is in contact with the rotor 210 to allow the smooth rotation of the roller 210; and

an oil circulation passage 215 is formed between the shaft 202 integrated with the rotor 210 and the lower housing 214, an oil circulation groove 216 is formed in the lower housing 214 and an oil collecting hole 217 is formed in the lower housing 214, so that a portion of oil supplied between the roller 207 and the rotor 210 flows through the oil circulation groove 216, is accumulated in the oil circulation groove 216 and is discharged through the oil collecting hole 217 to the

lower end of the compressed air tank 201.

6. A small-sized compressor, wherein a space 225 having a ring gear 226 at its peripheral surface is formed on the lower center portion of the roller 207, a space 227 having a ring gear 228 at its peripheral surface is formed on the upper center portion of the rotating shaft 202 and the sun gears 229 and 230 of the uniform velocity coupling 204 are engaged with the ring gears 226 and 228, characterized in that:

an air inlet 219 is formed through a side housing 218 and an air supply space 220 is formed between the side housing 218 and the rotor 210, so that air supplied from the outside through the air inlet 219 is temporarily stored in the air supply space 220;

an air supply hole 222 is formed at the left side of a circular vane 221 of the rotor 210, so that the air in the air supply space 220 is supplied to a compression chamber between the rotor 210 and the circular vane 221, which are integrated into a single body through a concave portion 223, through the air supply hole 222;

a circular vane 221 of the rotor 210 is inserted to the operating hole 224 of the roller 207 situated in the compression chamber between the rotor 210 and the integrated circular vane 221; and

a discharge hole 231 having a reed valve 232 is formed at the right side of the circular vane 221 so as to be connected to a compressed air storage chamber 233 and further to a compressed air tank 201 through a compressed air discharge hole 234.

7. The compressor according to claim 6, wherein an air supply hole 222 is formed at the right side of the circular vane 221 of the rotor 210, a discharge hole 231 having a reed valve 232 is formed on the left side of the circular vane 221, and the rotating shaft 202 is rendered to be rotated clockwise.

8. A small-sized compressor, a spiral central hole 304 being formed in the central portion of the rotating shaft 303 that is rotated in a compressed air tank 301 by a motor 302, so that oil is moved upward through the spiral central hole 304 to a portion in which a uniform velocity coupling 305 is mounted, wherein:

an oil circulation passage 310 is formed through the rotor 309 and an oil passage 311 is formed in the rotor 309, so that oil lubricates the upper end of the rotor 210 while being moved through the oil circulation passage 310 of the rotor 309 and is moved downward through the oil passage 311 of the rotor 309 and is supplied between the rotor 309 and the roller 312;

two oil circulation passages 313 are formed beside the bearing 307 and an oiling space 314 is formed around the roller 312, so that oil supplied to the roller 312 enters the oiling space 314 through the oil circulation passages 313; and

an oil collecting hole 315 is formed in the rotor 309, an oil circulation hole 317 is formed in the lower housing 316 and an oil collecting conduit 318 is connected to the oil circulation hole 317, so that oil passing through the roller 312 and the bearing 307, and the roller 312 and the rotor 309 passes through the oil collecting hole 315, is collected in the oil circulation hole 317 and is discharged through the oil collecting conduit 318 to the compressed air tank 301.

9. A small-sized compressor, wherein a space 327 having a ring gear 328 at its peripheral portion is formed on the lower center portion of the roller 312, a space 329 having a ring gear 330 at its peripheral portion is formed on the upper center portion of the rotating shaft 303, the sun gears 332 and 333 of the uniform velocity coupling 331 are engaged with the ring gears 328 and 330, and air compressed in the compressed chamber is supplied to the outside compressed air storage chamber 335 while being prevented from flowing backward by the reed valve 334, characterized in that:

an air inlet 319 is formed through the upper housing 306 and an air supply hole 320 is formed in the center portion of the bearing 307, so that air is supplied from the outside through the air inlet 319 and is temporarily stored in the air

supply hole 320;

an air supply hole 322 is formed at the right side of the operating hole 321 of the roller 312 and a compression chamber 323 is formed within the rotor 309, so that air in the air supply hole 320 is supplied to the compression chamber 323 through the air supply hole 322; and

projections 325a and 325b are formed at the entrance of the circular operating hole 321 of the roller 312 and concave connecting portions 326a and 326b are formed at the circular vane 324, so that air is compressed by the variation of the volume of the circular operating hole 321 and the compression chamber 323 while airtightness is maintained in such a way that the projections 325a and 325b are in contact with the concave connecting portions 326a and 326b because the circular operating hole 321 into which the circular vane 324 of the rotor 309 is inserted has a relatively large volume;

air supplied to the outer compressed air storage chamber 335 of the housing 316 is accumulated in the compressed air tank 301 through the compressed air discharge conduit 336; and

air compressed in the circular operating hole 321 is accumulated in the compressed air tank 301 through the compressed air discharge hole 337 having a backward-flowing-preventing reed valve 338.

10. The compressor according to claim 9, wherein said compressed air is generated while being simultaneously compressed in the compression chamber 323 and the circular operating hole 321 of the roller 312

11. The compressor according to claim 9, wherein:

an air supply hole 362 is formed in the center portion of a bearing and backward-flowing-preventing reed valves 366a and 367a are mounted to air supply holes 366 and 367, so that air supplied from the outside through the air inlet of the upper housing and temporarily stored in the air supply hole 362 is supplied to a compression chamber 368 formed between a roller 363 and a rotor 369 through the

air supply holes 366 and 367;

the projections are formed at the entrances of two circular operating holes 363 and 365 to which two circular vanes 370 and 371 formed on the opposite sides of the rotor 369 are inserted and the concave connecting portions are formed on the two circular vanes 370 and 371, so that air is compressed by the variation of the volume of the circular operating holes 364 and 365 and the compression chamber 368 while airtightness is maintained in such a way that the projections 364 and 365 are in contact with the concave connecting portions of the circular vanes 370 and 371;

reed valves 372 and 373 are formed on the peripheral surface of the rotor 369, so that air compressed in the compression chamber 368 is supplied to the compressed air storage chamber 375 while being prevented from flowing backward and is accumulated in the compressed air tank; and

compressed air discharge holes 376 and 378 respectively have backward-flowing-preventing reed valves 377 and 379, so that air compressed in the two circular operating holes 364 and 365 of the roller 363 is discharged through the compressed air discharge holes 376 and 378 and is accumulated in the compressed air tank together with circulated oil.

12. A small-sized compressor, wherein a space 431 having a ring gear 432 at its peripheral surface is formed at the center of the lower end of the inner rotor 411 that is inserted into the circular hole 428 so that the multiple clamper 429 is made airtight by an apex seal 430, a space 433 having a ring gear 434 at its peripheral surface is formed at the center of the upper end of the shaft 403, and sun gears 436 and 437 formed at both sides of a uniform velocity coupling 435 are engaged with the ring gears 432 and 434, thereby allowing the inner rotor 411 eccentric to the shaft 403 to be rotated at a uniform velocity, characterized in that:

a spiral central hole 404 is formed in the central portion of the shaft 403 rotated in a motor case 401 by a motor 402;

a balance type seal 400, wherein a seal ring 407 is elastically pushed by a

washer spring 408, a backup ring 409 and an O-ring 410, is formed in a space that is connected to the lower end of the spiral central hole 404 through a bearing oil supply hole 406;

an oiling space 413 of the inner rotor 411 is connected to the upper end of the spiral shaft hole 404 through an oil circulation hole 412;

an oil inlet 416 and an oil supply hole 417 are formed to be connected to the oil supply hole 415 of the upper housing 420 that is positioned on the upper end of the shaft 403;

an oil circulation hole 418 connected to the oil discharge hole 417 is connected to two discharge holes 419 of the upper housing 420 on the outer surface of which cells are formed;

an air circulation hole 424 is formed between the housing 422 connected to the outside through an air inlet 423 and an outer rotor 414;

an air inlet 426 is formed at the right side of the vane 425 of the outer rotor 414 to be connected to a compressing chamber 427 formed beside the inner rotor 411;

a multiple clamper 429 consisting of overlapped thin ring-shaped clampers is mounted to the circular hole 428 of the inner rotor 411 to which the vane 425 of the outer rotor 414 is inserted; and

a central space 440 is connected to a supply hole 439a of the inner rotor 411 around which a reed valve 438 is mounted and a circular space 439 is connected.

13. A small-sized compressor, a rotating shaft 512 of a first rotating body 511 is rotated in a compressed air tank 501 by a motor (not shown) while being fitted into the shaft bore 503 of a lower housing 502s, air entering a compression chamber 518 being compressed by contacting a spiral vane of the first rotating body 511 with a spiral vane of a second rotating body 521, wherein:

a cover 513 is formed at an outside of the spiral vane of the first rotating body 511, and a circular projecting 514 integrated with a ring gear 515 at its inner

surface is connected to an end of the cover 513;

a shaft bore 522 integrated with sun gears 523 at its outer surface is formed at one side of a second rotating body 521;

a uniform velocity coupling 531 is mounted with the ring gear 515 of the circular projection 514 and the sun gear 523 of the shaft bore 522 respectively engaged with the sun gear 532 of its outer surface and the ring gear 533 of its inner surface, so that the rotating force of the first rotating body 511 is transmitted to the second rotating body 521 and allows the second rotating body 521 to be rotated at a uniform velocity; and

a compressed air discharge hole 506 at the central portion of the bearing 505 of the upper housing 504 allows air compressed by the spiral vanes of the first and second rotating bodies 511 and 521 to be discharged into a compressed air tank 501 while the shaft bore 522 of the second rotating body 521 is fitted around the bearing 505 and is rotated.

14. A scroll compressor, wherein:

an oil supply hole 519 is formed in the central portion of the rotating shaft 512 so that oil is moved upward through the oil supply hole 519 and is supplied to the shaft bore 503 of the lower housing 502;

an oil supply passage 520 is formed in the interior of the first rotating body 511, so that oil supplied to the end of the oil supply hole 519 moves through the oil supply passage 520, passes through the portions at which the first rotating body 511 and the upper housing 504 are in contact with each other and is supplied to the portion in which the uniform velocity coupling 531 is mounted; and

a lower oil hole 524 is formed in the second rotating body 521, an oil circulation groove 509 and an upper oil hole 525 are formed to be in contact with the bearing 505 of the upper housing 504 and an oil discharge hole 510 is formed in the upper housing 510, so that a portion of oil, which allowed the uniform velocity coupling 531 to transmit power without hindrance in the portion in which the uniform velocity coupling 531 is mounted, passes through the lower oil hole

524, the oil circulation groove 509 and the upper oil hole 525 and is discharged into a compressed air tank 501 through the oil discharge hole 510.

FIG.1

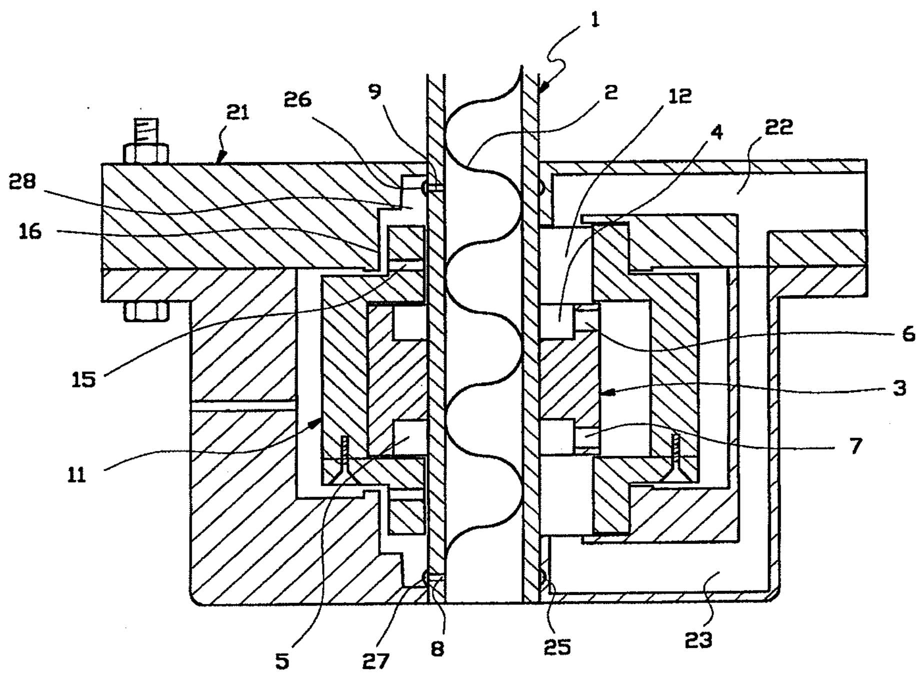

FIG.2

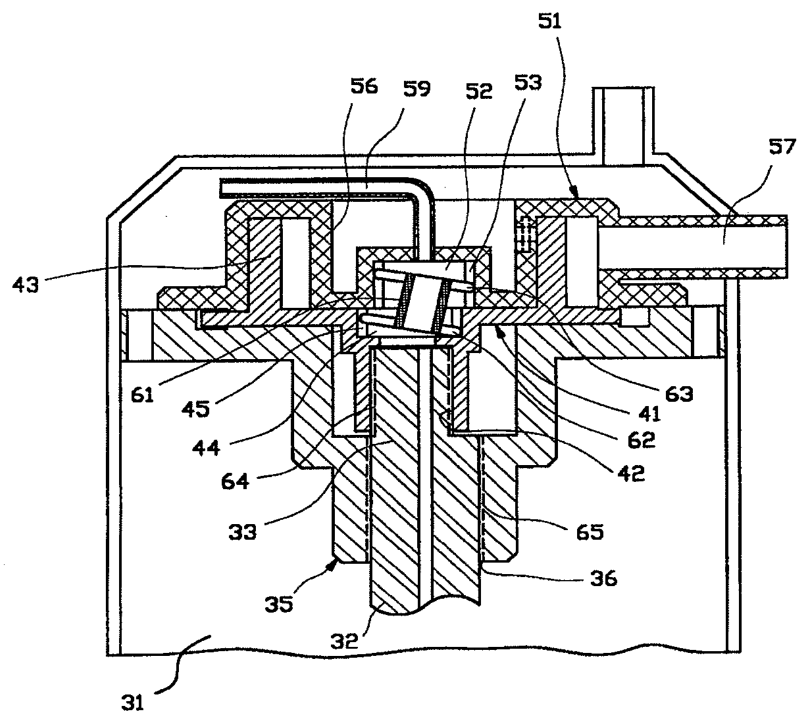

FIG.3A

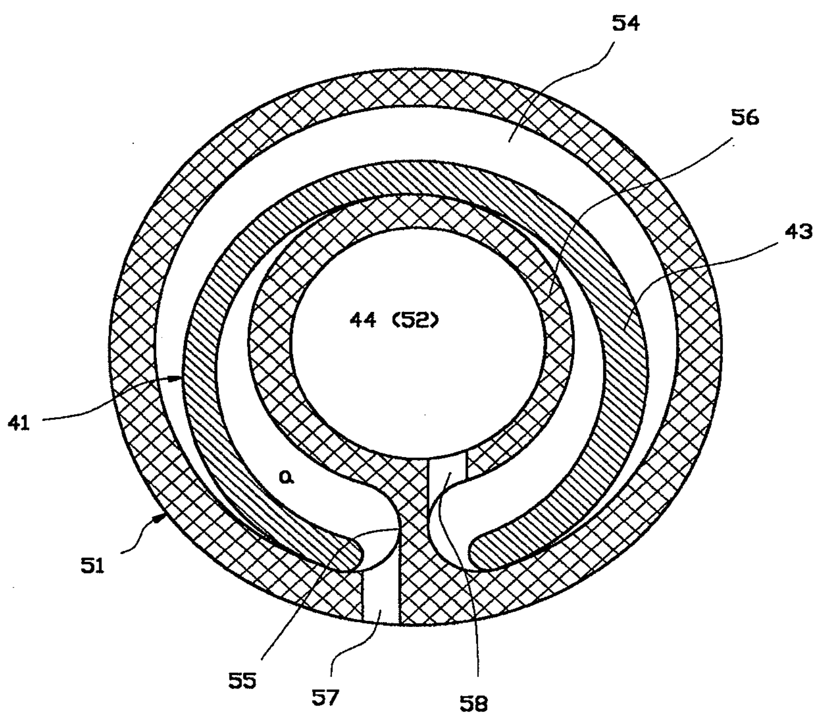

FIG.3B

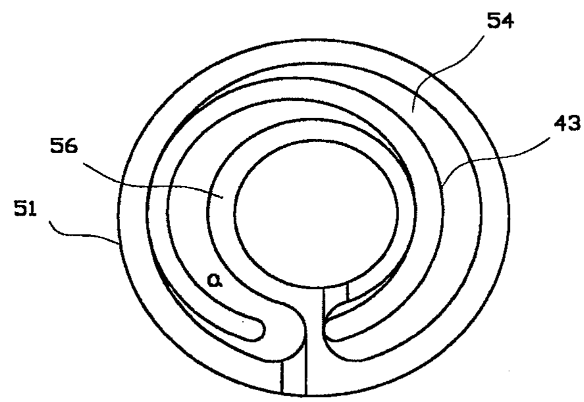

FIG.3C

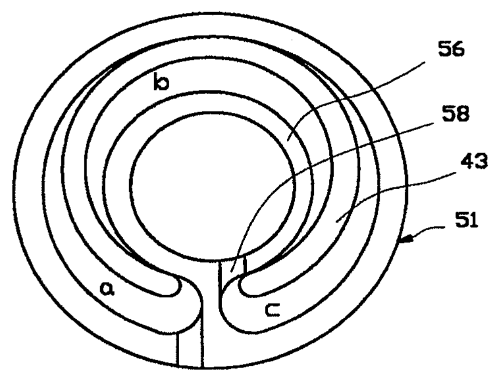

FIG.3D

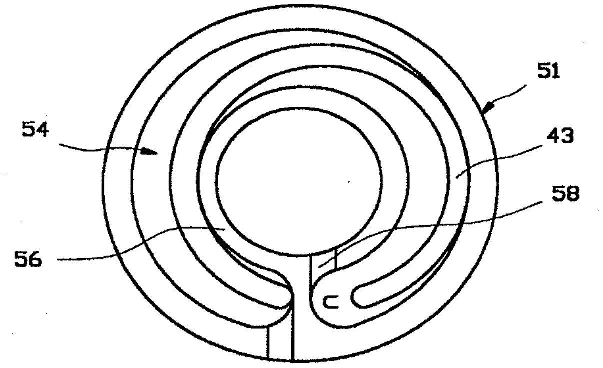

FIG.4

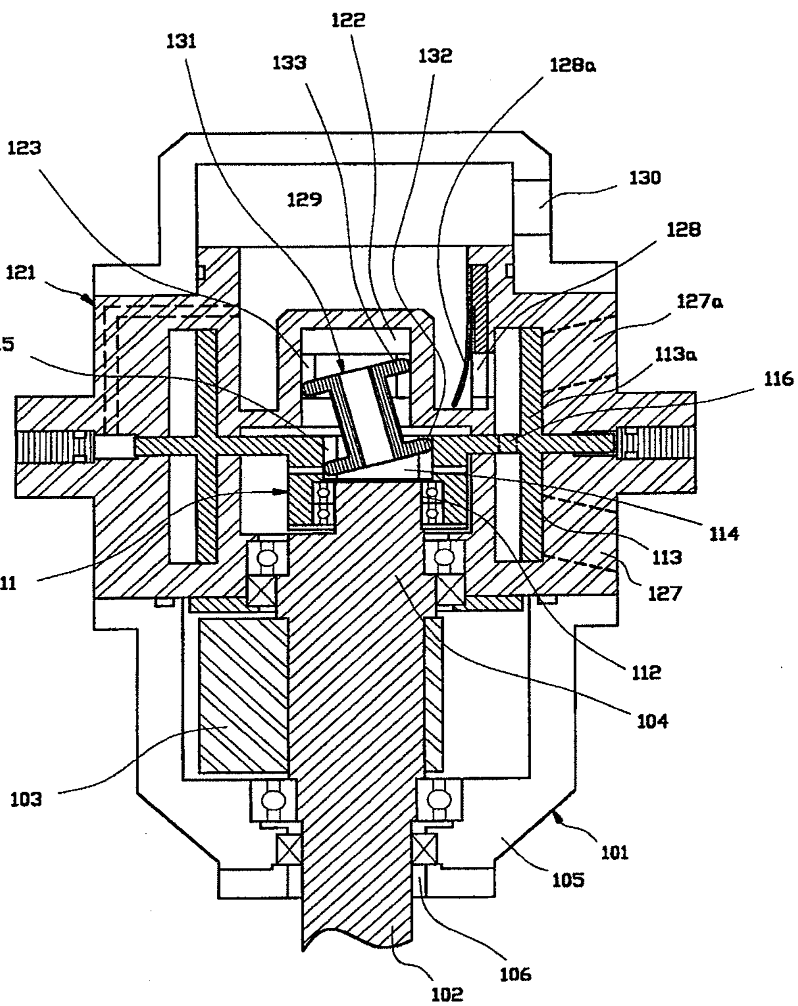
122
131
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FIG.5A

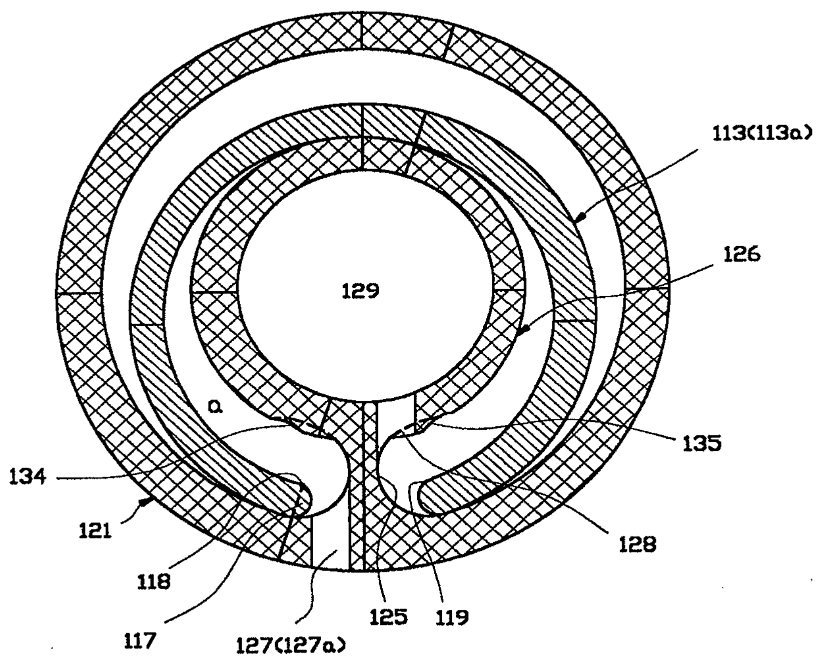

FIG.5B

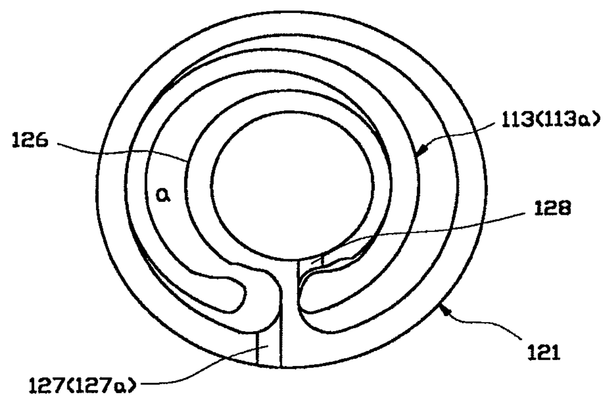

FIG.5C

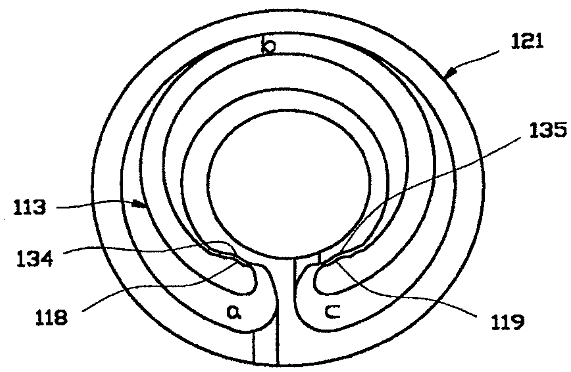

FIG.5D

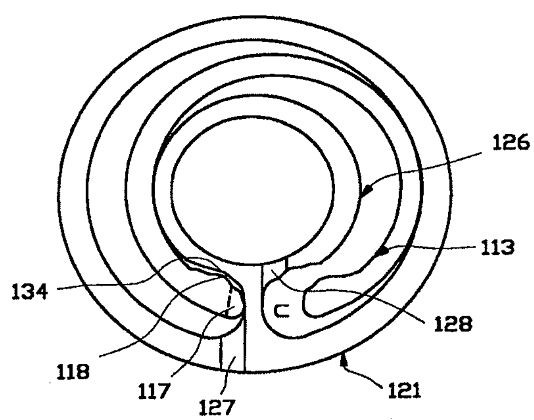

FIG.6

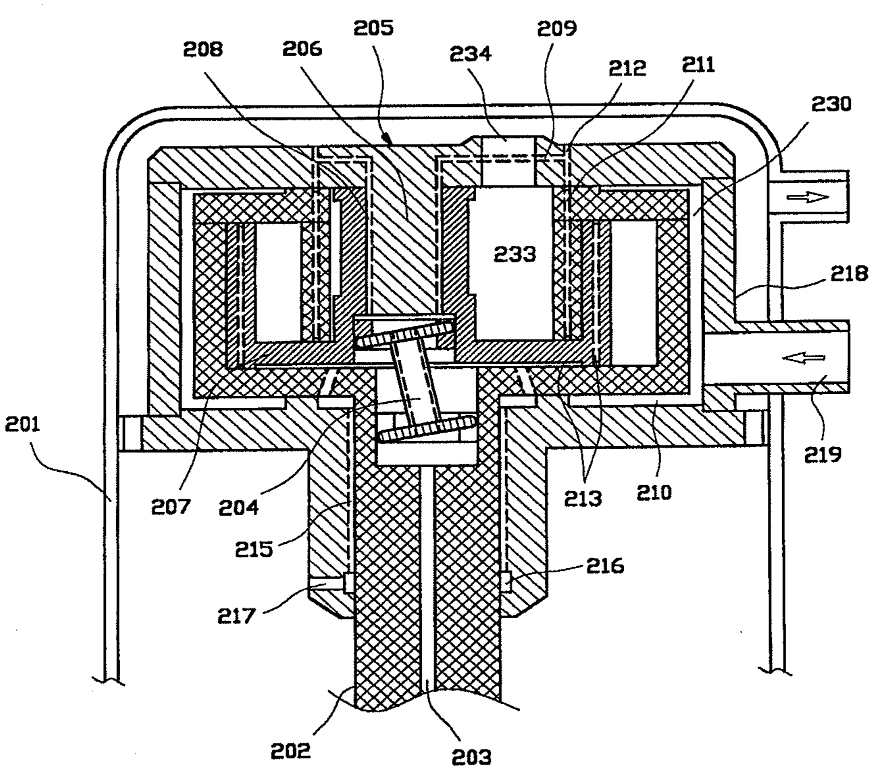
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FIG.7A

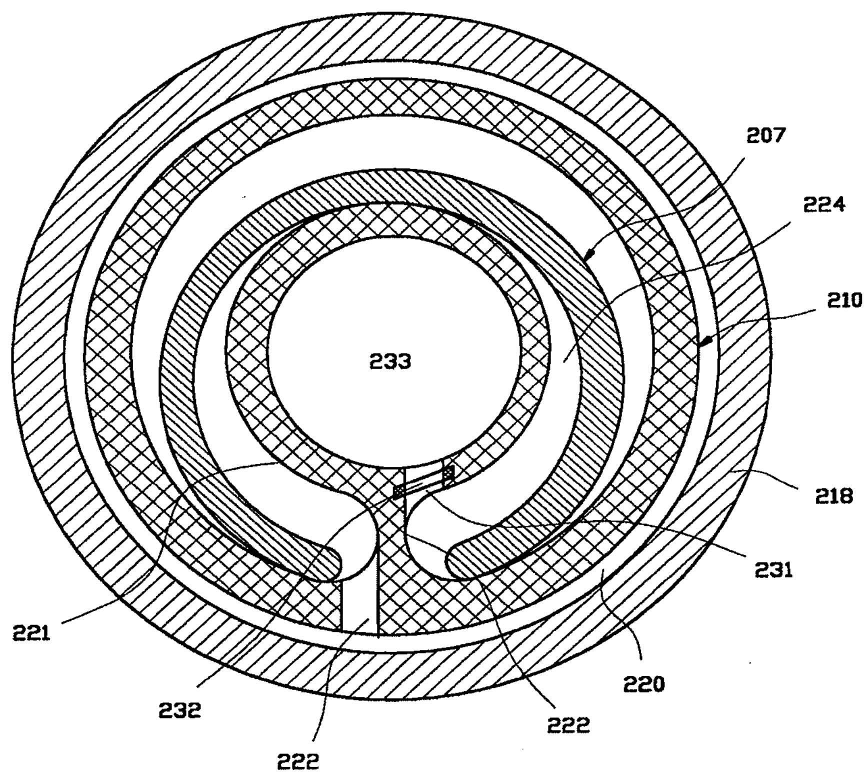

FIG.7B

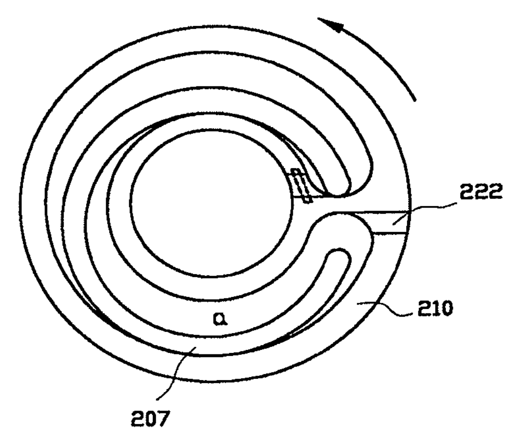

FIG.7C

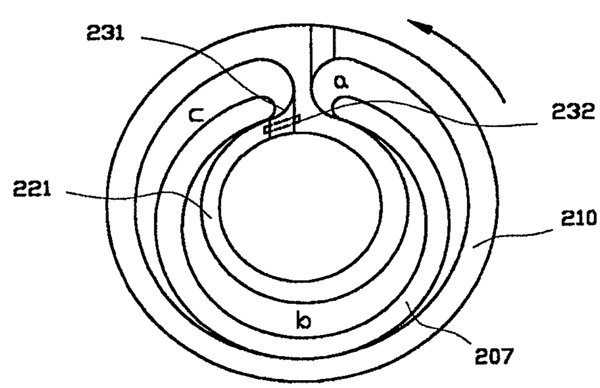

FIG.7D

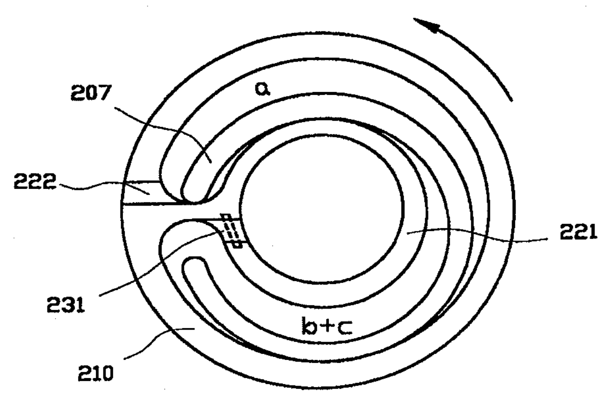

FIG.8

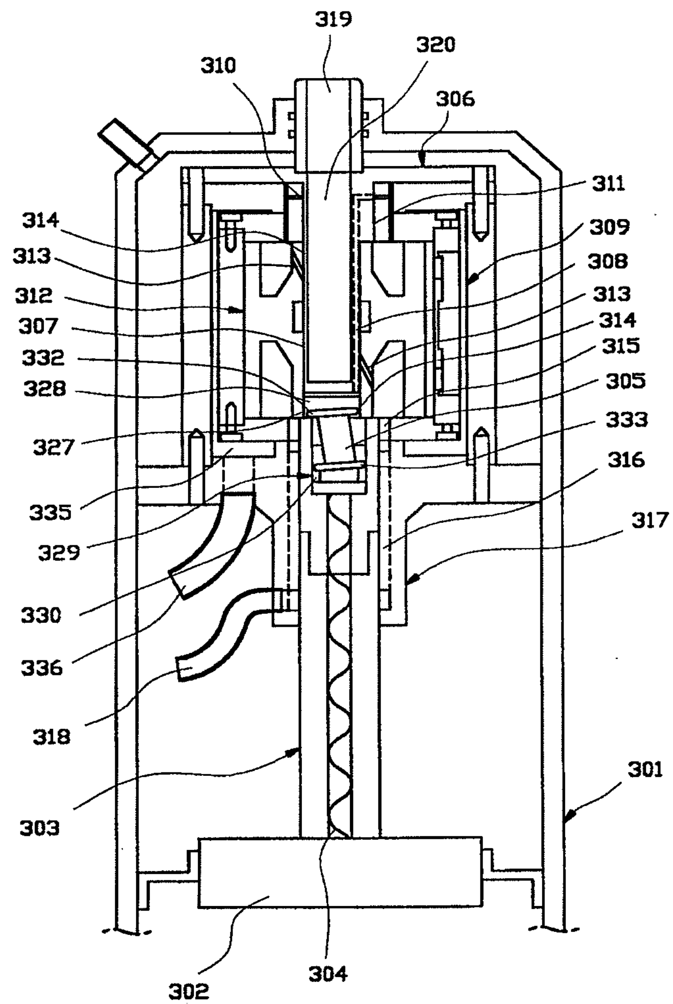
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FIG.9A

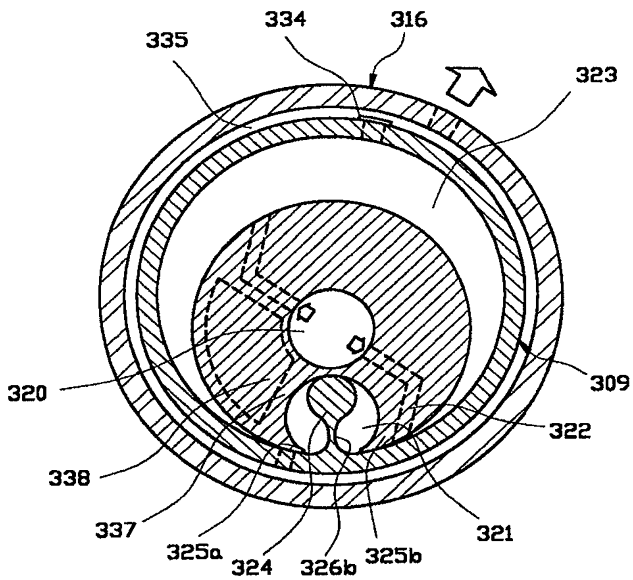
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FIG.9B

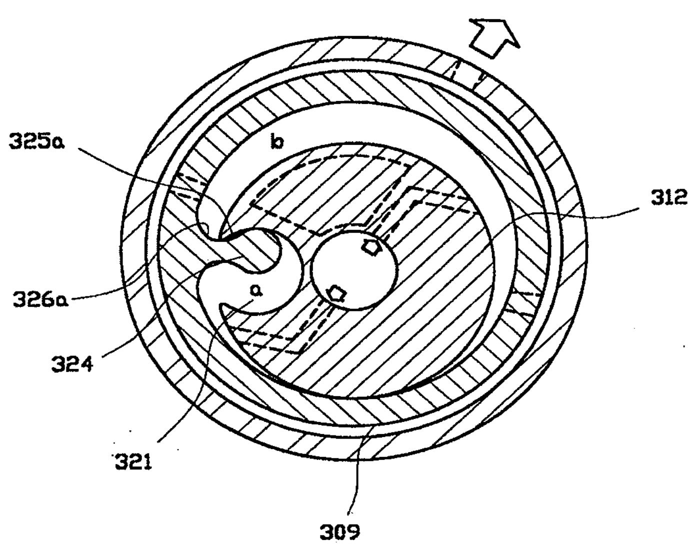
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FIG.9C

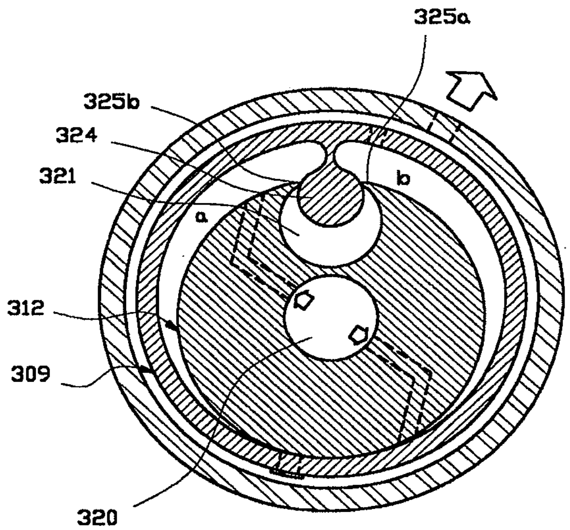

FIG.9D

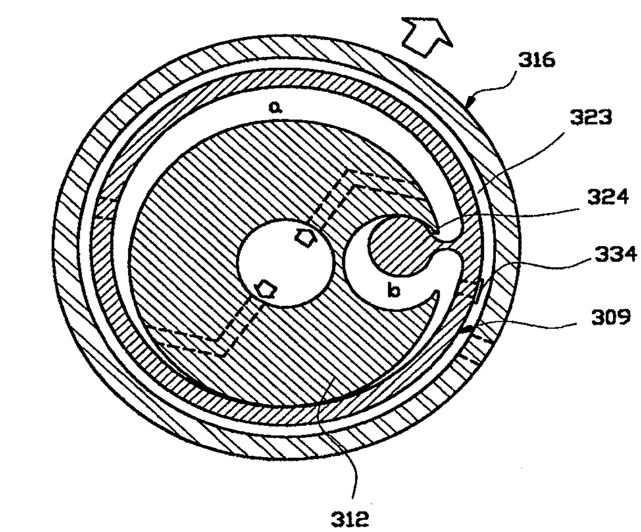

FIG.10A

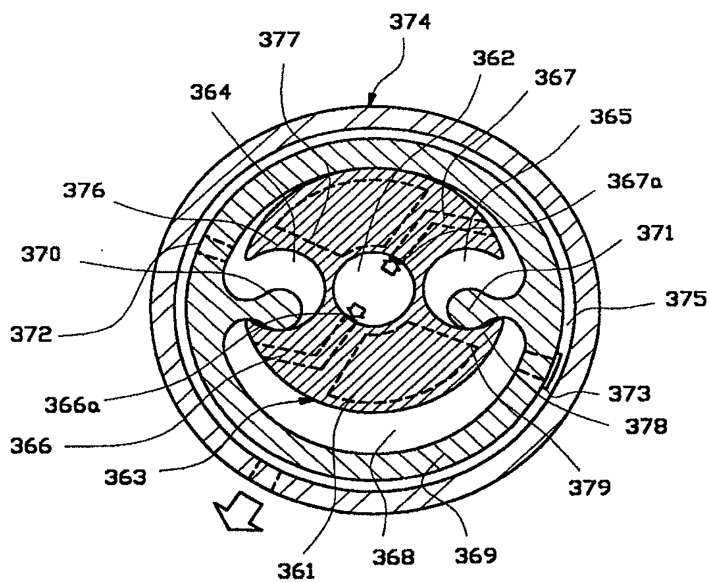

FIG.10B

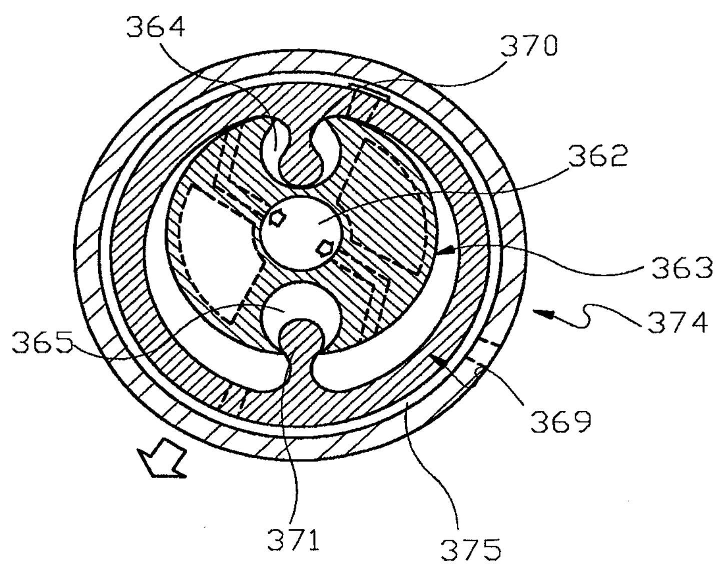

FIG.11

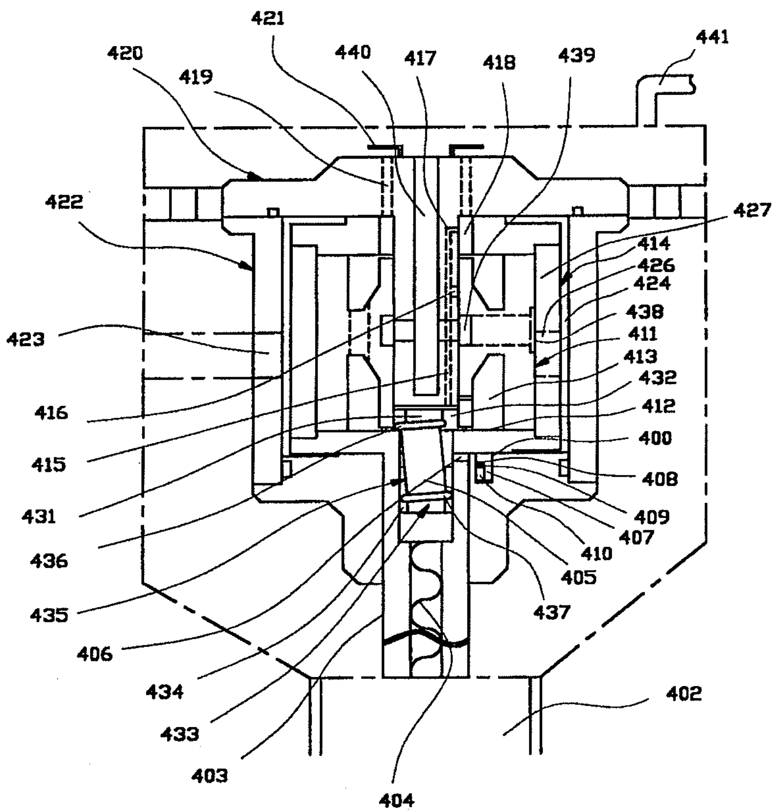
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FIG.12

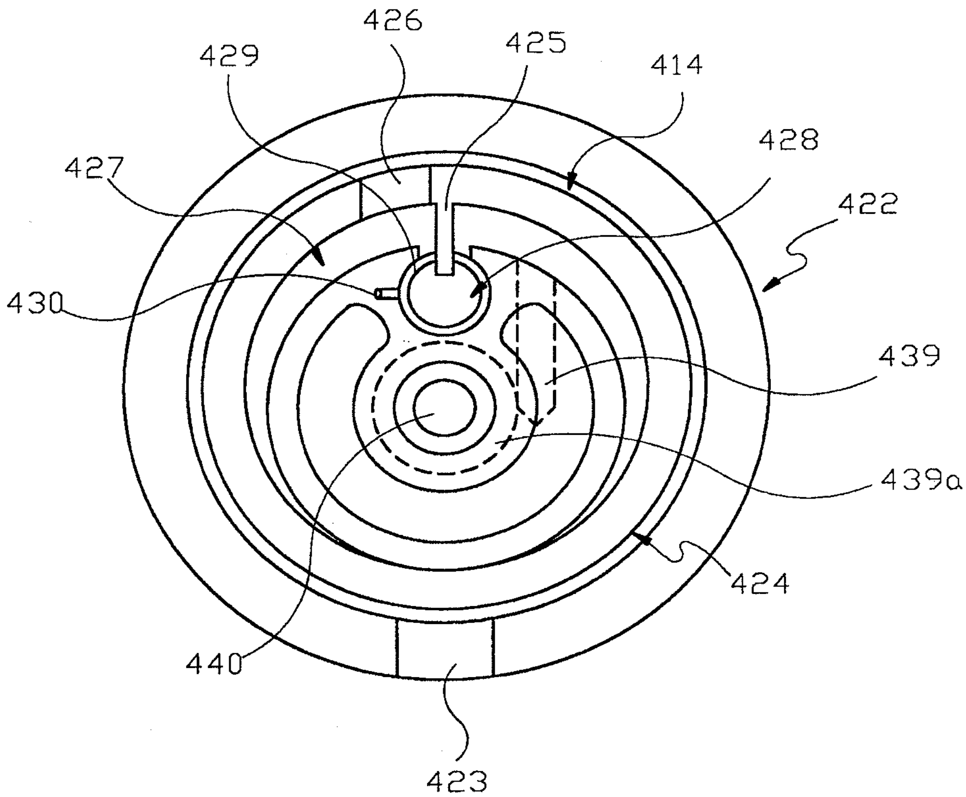
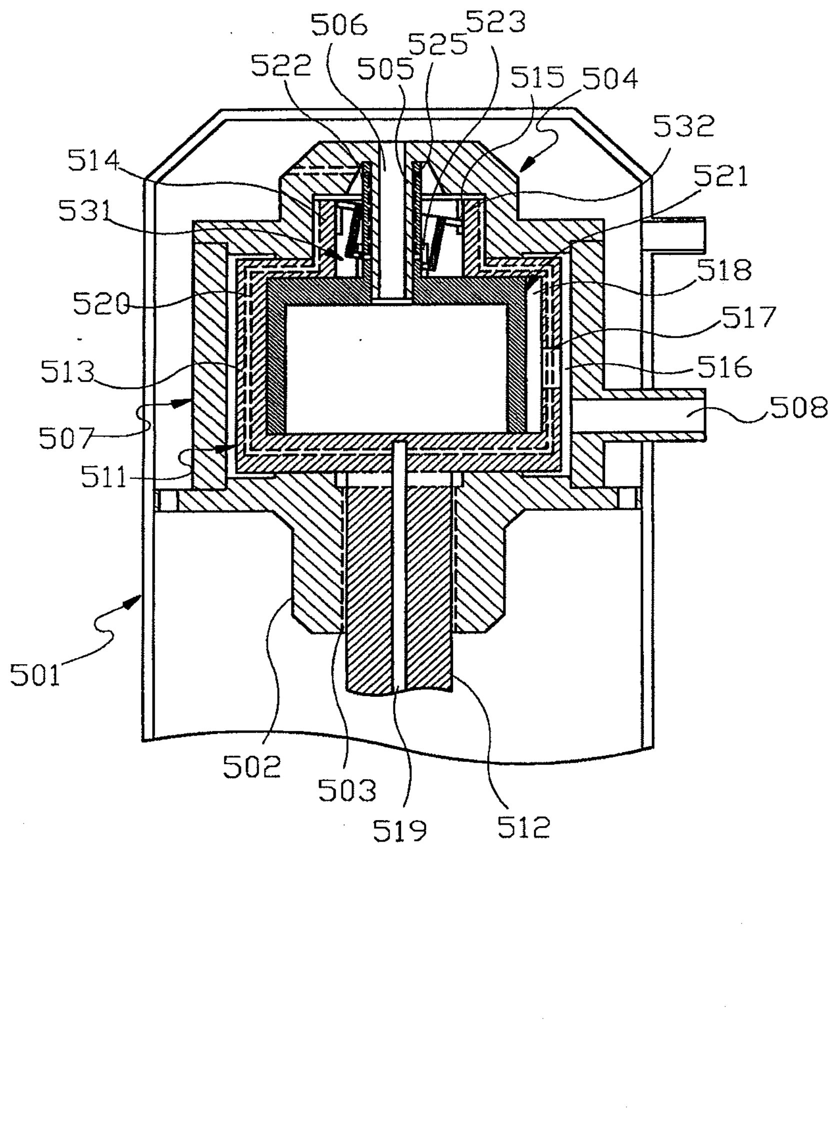


FIG.13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INTERNATIONAL SEARCH REPORT	International application No. PCT/KR00/00384

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 F04C 18/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 F04C 18/02

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patents and applications since 1975, Korean Utility models and applications for Utility Models since 1975, Japanese Patents and applications since 1975, KR : IPC as above and KR,JP : classes as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A		1 - 7
X	KR 1998-080059 A (MIMURA GENJI , JP) 25 NOVEMBER 1998	8
Y	KR 1998-080059 A (MIMURA GENJI , JP) 25 NOVEMBER 1998	9 - 10
	JP 06 - 280758 A (KAJI JIDEO , JP) 04 OCTOBER 1994	
A		11 - 14

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 AUGUST 2000 (07.08.2000)	14 AUGUST 2000 (14.08.2000)

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